What is UV radiation?

There are many types of energy waves. Together they are known as the electromagnetic spectrum. Ultraviolet radiation (also known as UV radiation or ultraviolet rays) are one type. Other types of energy waves are gamma rays, X-rays, [visible light](http://www.biospherical.com/nsf/student/page9.html#visible), infrared rays, and radio waves. Ultraviolet (UV) rays have shorter wavelengths than visible light. Though these waves are invisible to the human eye, some insects, like bumblebees, can see them!

Where do UV rays come from?

The sun is a major source of ultraviolet rays. Though the sun emits all of the different kinds of [electromagnetic radiation](http://www.biospherical.com/nsf/student/page9.html#electromagnetic), 99% of its rays are in the form of [visible light](http://www.biospherical.com/nsf/student/page9.html#visible), ultraviolet rays, and infrared rays (also known as heat). Man-made lamps can also emit UV radiation and are often used for experimental purposes.

What are the types of UV rays?  
  
Ultraviolet rays can be subdivided into three different groups, [UV-A, UV-B, and UV-C](http://www.biospherical.com/nsf/student/page9.html#UVradiation). These groups tell you how much energy each type of UV ray has. UV-C is most energetic and most harmful; UV-A is least energetic and least harmful.

Luckily, UV-C rays do not reach the earth’s surface because of the [ozone layer](http://www.biospherical.com/nsf/student/page1.html). This layer of the Earth’s atmosphere blocks UV-C rays from reaching the surface. Unfortunately though as the ozone layer shrinks, more UV-C rays do reach the Earth. Both UV-A and UV-B rays pass through the ozone layer and reach the surface of the Earth.

What are the effects of UV rays?

Ultraviolet rays carry a lot of energy, often *too much* energy. Since they carry more energy, they can harm cells in living organisms. For humans, sunburns are a result of too much UV radiation. Scientists now say that too much exposure to the sun before age 18 can cause big problems. UV rays can cause [premature](http://www.dnr.state.wi.us/org/caer/ce/eek/earth/air/snfnglos.htm" \l "premature) aging (yuck - wrinkles!), skin cancer, eye [cataracts](http://www.dnr.state.wi.us/org/caer/ce/eek/earth/air/snfnglos.htm" \l "cataracts), and may even cause problems with your [immune system](http://www.dnr.state.wi.us/org/caer/ce/eek/earth/air/snfnglos.htm" \l "immune)!

In plants, UV light can cause severe radiation poisoning within plant cells, resulting in loss of color, stunted or deformed growth or death.

What affects the amount of UV rays that reach the Earth?

## The first factor that affects the amount of UV rays that hit Earth is the time of day. Between the hours of 11 am and 3 pm, when the sun is at its highest in the sky, more UV rays hit the Earth.

## A second important thing that affects the amount of UV is altitude. As a rule of thumb, UV levels increase about 4% for every 1,000 foot gained in altitude. This increase has nothing to do with being closer to the sun. The altitude gain is very tiny in comparison to the distance from the Earth to the Sun. Instead, the increase is the result of a thinner atmosphere with a smaller number of air molecules present to absorb the UV radiation.

## Other factors that have an influence on UV levels are the physical features of the land—sand, snow, and water all tend to reflect UV rays making them more dangerous.

## So how do you protect yourself from UV radiation?

The good news is that you can protect yourself from UV rays and prevent damage from happening.

* Don’t spend a long amount of time in the sun, especially during mid-day.
* Wear sunscreen. Look for one that blocks both UV-A and UV-B rays.
* Wear sunglasses, a hat, and clothes that cover your arms and legs. The less skin that is exposed to UV rays, the less damage will occur.
* Don’t sunbathe or use tanning booths. Both of these activities increase your risk of skin cancer.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Ultra-Violet (UV) Rays**

Read the background information on UV rays to answer these questions. You will use your answers to write a background information paragraph for your home lab and to help you write your hypothesis.

1. What are ultra-violet (UV) rays? (sentence 1 in your background information paragraph)
2. Where do UV rays come from? (sentence 2 in your background information paragraph)
3. What is the connection between UV rays and the ozone layer? (sentence 3 in your background information paragraph)
4. When and where are UV rays more dangerous? (sentence 4 in your background information paragraph)
5. What is 1 harmful effect of UV rays on human cells? (sentence 5 in your background information paragraph)
6. What is 1 harmful effect of UV rays on plant cells? (sentence 6 in your background information paragraph)
7. What are 2 ways to protect yourself from harmful UV rays? (sentence 7 in your background information paragraph)

**Now use this information to type a one paragraph background information essay on ultra-violet rays.**